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Transitioning SPIDERS Technology to the Civilian Sector

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Overview

- What Microgrids Can Offer a Utility
- Goals of the SPIDERS Phase 1 Operational Demonstration (OD)
- Results of the Phase 1 Utility Assessment Reports (UAR)
- Next Steps (Phase 2 and Phase 3)

What Microgrids Can Offer

- The operation of a microgrid can greatly increase the reliability of the end-use loads.
- The operation of a microgrid can increase the efficiency of local/distributed generation.
- Since there is an active source, renewables can continue operations when the utility source is lost.

Goals of the Phase 1 Operational Demonstration

- SPIDERS is a 3 year JCTD with a "crawl, walk, run" philosophy.

- There are four critical requirements listed in the ID as being necessary to demonstrate enhanced power surety for national security:
  1) Protect task critical assets from loss of power due to cyber-attack.
  2) Integrate renewables and other distributed energy generation concepts to power task critical assets in times of emergency.
  3) Sustain critical operations during prolonged power outages.
  4) Manage installation electrical power and consumption efficiency, to reduce petroleum demand, carbon "bootprint", and cost.

- Phase 1 was conducted at JBPHH and was designed to show the walk component of the program.
  - Show that a stable and reliable microgrid could be formed when utility power is lost.
  - Show that renewables could be effectively integrated into a stable microgrid.
  - Ensure a cyber-secure operational environment.

Phase 1 Operational Demonstration

- Phase 1 was composed of primarily legacy equipment. 1 generator and the solar panels were already in place.
- The OD was a 72 hour demonstration to ensure that the system performed as designed.
- The evaluation was conducted by PNNL, who was not part of the design or build team.

Results of the Phase 1 Utility Assesment Report

- Overall the Phase 1 OD was considered a success, as indicated in the Utility Assessment Report.

- Key OD observations include:
  - A reduction in fuel consumption of 30.4% was achieved.
  - Associated reduction in emissions were achieved.
  - The successful integration of renewables with a peak of 12.5% was achieved.
  - The reliability of the system was increased since there were 2 generation sources that could be accessed.
  - Power quality was consistent with standards.

- The Phase 1 OD was conducted on a small portion of a much larger facility. Phase 2 and 3 will move towards larger, and more capable, microgrids.

Next Steps (Phase 2 and Phase 3)

- Phase 2 is currently in process and the OD is scheduled for late October.
  - Phase 2 will be conducted at Fort Carson Colorado.
  - 1 MW of solar is installed at the Phase 2 location.
  - Electric Vehicles (EVs) will be included.
  - Variable priority loads, similar to direct load control, will be implemented.

- Phase 3 is in the planning phase and will include a complete facility.
  - Phase 3 will be conducted at Camp Smith Hawaii.

Continuing Transition Activities

- Submitted Panel for Distributech 2014
  - Sandia
  - Burns & McDonnell
  - NORTHCOM
  - PACOM
  - ARMY
  - PNNL

- Work with umbrella organizations
  - National Rural Electric Co-operative Association (NRECA)
  - American Public Power Association (APPA)
  - Edison Electric Institute (EEI)
  - National Institute Of Standards and Technology (NIST)

Questions or Comments